AMENDMENTS TO THE CLAIMS

Please amend claims 1, 4, 14, 34, 37, 39, 47 and 67, such that the status of the claims is as follows:

1. **(Currently Amended)** A system for monitoring rotating machinery having a shaft and circumferentially disposed extensions rotatable with said shaft and spaced apart from one another, the system comprising:

a plurality of proximeters positioned proximate to said rotating machinery and each proximeter being operable to measure and transmit resonant vibration frequency and <u>bending</u> amplitude data for said rotating machinery derived from a transit time between said individual rotating extensions, along with <u>distance data derived from</u> signal amplitude data for a proximeter signal, wherein said plurality of proximeters are positioned so as to enable mapping of ~~substantially an entire~~ <u>a</u> resonance period of said rotating machinery; and

a processor electrically coupled to receive said data and configured to correlate said data and thereby produce an assessment of operational health for said machinery.

2. **(Original)** A system according to claim 1, wherein said processor assessment includes a remaining operational life prediction for said machinery.

3. **(Original)** A system according to claim 1, wherein said processor assessment includes a maintenance schedule for said machinery.

4. **(Currently Amended)** A system according to claim 1, wherein said ~~resonant vibration~~ <u>distance</u> data includes radial runout data for said shaft.

5. **(Original)** A system according to claim 4, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said radial runout data indicates radial positions of said teeth.

6. **(Original)** A system according to claim 1, wherein said rotating machinery includes a rotating shaft, and said processor correlates said resonant vibration data and radial runout data for said shaft.

7. **(Original)** A system according to claim 6, wherein said proximeters further measure and transmit axial movement data for said shaft.

8. **(Original)** A system according to claim 7, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said proximeters further measure and transmit axial movement data.

9. **(Original)** A system according to claim 1, wherein said processor correlates said resonant vibration data and axial movement data for said shaft.

10. **(Original)** A system according to claim 1, wherein said proximeters are electromagnetic proximeters.

11. **(Original)** A system according to claim 1, wherein said proximeters are capacitive proximeters.

12. **(Original)** A system according to claim 1, wherein said proximeters are optical proximeters.

13. **(Canceled)**

14. **(Currently Amended)** A system according to claim 1, further comprising:

    multiple rotating machinery components having a shaft and circumferentially disposed extensions rotatable with said shaft and spaced apart from one another; and

    additional proximeters, positioned circumferentially apart from one another and proximate to different respective components, and operable to measure and transmit nonduplicative resonant vibration and <u>bending</u> amplitude data for each of said rotating extensions along with <u>distance data derived from</u> signal amplitude data for said multiple rotating machinery components.

15. **(Original)** A system according to claim 1, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth.

16. **(Previously Presented)** A system according to claim 1, wherein a first and a second of said plurality of proximeters are orientated at about 90° to each other.

17. **(Original)** A system according to claim 16, wherein said gearbox comprises at least two gears that mesh at a meshing point, and at least one of said proximeters is disposed at a location approximately 180° from said meshing point.

18. **(Original)** A system according to claim 1, further comprising:

    a housing having an interior space in which said rotating machinery is disposed, and a wall defining at least a portion of said interior space and separating said proximeters from said rotating machinery.

19. **(Original)** A system according to claim 18, wherein at least one of said proximeters is an electromagnetic proximeter, and said wall has a blind hole extending partially through said wall in which one of said electromagnetic proximeter is disposed.

20. **(Original)** A system according to claim 1, wherein at least one of said proximeters is exposed to said rotating machinery.

21. **(Original)** A system according to claim 1, wherein said processor compares said measurements with predetermined values to assess said rotating machinery operational health.

22. **(Original)** A system according to claim 21, wherein said predetermined values include previously accumulated resonance data, including established maximum values for acceptable machinery fatigue levels.

23. **(Original)** A system according to claim 22, wherein said resonance data comprises vibration frequency data.

24. **(Original)** A system according to claim 22, wherein said resonance data comprises circumferential vibration amplitude data.

25. **(Original)** A system according to claim 22, wherein said predetermined values further comprise values for a radial gap between a gear tooth and a housing in which said gear tooth is housed.

26. **(Original)** A system according to claim 1, further comprising:

an alerting signal generator that produces a signal reporting said rotating machinery operational health.

27. **(Original)** A system according to claim 26, wherein said alerting signal comprises instructions for maintaining said rotating machinery.

28. **(Original)** A system according to claim 26, wherein said alerting signal comprises a textual, audio, or video signal.

29. **(Original)** A system according to claim 26, wherein said alerting signal automatically halts action of said rotating machinery.

30. **(Original)** A system according to claim 1, wherein said processor is configured to detect rotating machinery chatter.

31. **(Original)** A system according to claim 30, wherein said processor is configured to detect a frequency and amplitude of said machinery chatter.

32. **(Original)** A system according to claim 31, wherein said processor is configured to assess lubricity degradation for said rotating machinery based on said machinery chatter.

33. **(Original)** A system according to claim 1, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said proximeters are spaced at odd harmonics of the resonance frequency quarter wavelength of said teeth.

34. **(Currently Amended)** A method for monitoring rotating machinery having a shaft and circumferentially disposed extensions rotatable with said shaft and spaced apart from one another, the method comprising the steps of:

positioning a plurality of proximeters proximate to said rotating machinery, each of said

proximeters being operable to measure and transmit resonant vibration and

bending amplitude data for said rotating machinery derived from a transit time

between said individual rotating extensions, along with distance data derived from

signal amplitude data for a proximeter signal;

receiving and correlating said data using a processor that is electrically coupled to said

plurality of proximeters to map substantially an entire a resonance period of said

rotating machinery; and

producing an assessment of operational health for said machinery based on said

measurements using said processor; and

outputting the assessment of operational heath.

35. **(Original)** A method according to claim 34, wherein said assessment includes a remaining operational life prediction for said machinery.

36. **(Original)** A method according to claim 34, wherein said processor assessment includes a maintenance schedule for said machinery.

37. **(Currently Amended)** A method according to claim 34, wherein said rotating machinery includes a rotating shaft, and said resonant vibration distance data includes radial runout data for said shaft.

38. **(Original)** A method according to claim 37, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said radial runout data indicates radial positions of said teeth.

39. **(Currently Amended)** A method according to claim 34, wherein said processor correlates said ~~resonant vibration~~ distance data and thereby produces radial runout data for said shaft.

40. **(Original)** A method according to claim 34, wherein said rotating machinery includes a rotating shaft, and said resonant vibration data includes axial movement data for said shaft.

41. **(Original)** A method according to claim 40, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said axial movement data indicates radial positions of said teeth.

42. **(Original)** A method according to claim 34, wherein said processor correlates said resonant vibration data and thereby produces axial movement data for said shaft.

43. **(Original)** A method according to claim 34, wherein said proximeters are electromagnetic proximeters.

44. **(Original)** A method according to claim 34, wherein said proximeters are capacitive proximeters.

45. **(Original)** A method according to claim 34, wherein said proximeters are optical proximeters.

46. **(Original)** A method according to claim 34, wherein said proximeters are fiber optical proximeters.

47. **(Currently Amended)** A method according to claim 34, wherein said positioning step further comprises circumferentially positioning additional proximeters apart from one another and proximate to different respective rotating machinery components having a shaft and circumferentially disposed extensions rotatable with said shaft and spaced apart from one another, said additional proximeters being operable

to measure and transmit nonduplicative resonant vibration frequency and <u>bending</u> amplitude data for each of said rotating extensions of said multiple components.

48. **(Original)** A method according to claim 34, wherein said rotating machinery is a gearbox comprising a gear having multiple teeth.

49. **(Original)** A method according to claim 48, wherein said assessing step comprises assessing operational health of each of said teeth.

50. **(Original)** A method according to claim 48, wherein said gearbox comprises at least two gears that mesh at a meshing point, and said positioning step comprises positioning at least one of said proximeters at a location approximately 180 degree from said meshing point.

51. **(Original)** A method according to claim 34, wherein said positioning step comprises attaching said proximeter to a housing having an interior space in which said rotating machinery is disposed, and a wall defining at least a portion of said interior space and separating said proximeter from said rotating machinery.

52. **(Original)** A method according to claim 51, wherein at least one of said proximeters is an electromagnetic proximeter, and said positioning step comprises positioning said proximeter in a blind hole that is formed in and extends partially through said wall.

53. **(Original)** A method according to claim 34, wherein said positioning step comprises exposing at least one of said proximeters to said rotating machinery.

54. **(Original)** A method according to claim 34, wherein said assessing step comprises comparing said measurements with predetermined values to assess said rotating machinery operational health.

55. **(Original)** A method according to claim 54, wherein said predetermined values include previously accumulated resonance data, including established maximum values for acceptable machinery fatigue levels.

56. **(Original)** A method according to claim 55, wherein said resonance data comprises vibration frequency data.

57. **(Original)** A method according to claim 55, wherein said resonance data comprises circumferential vibration amplitude data.

58. **(Original)** A method according to claim 55, wherein said predetermined values further comprise values for a radial gap between a gear tooth and a housing in which said gear tooth is housed.

59. **(Original)** A method according to claim 34, further comprising the step of: generating an alerting signal that reports said rotating machinery operational health.

60. **(Original)** A method according to claim 59, wherein said alerting signal comprises instructions for maintaining said rotating machinery.

61. **(Original)** A method according to claim 59, wherein said alerting signal comprises a textual, audio, or video signal.

62. **(Original)** A method according to claim 59, wherein said alerting signal automatically halts action of said rotating machinery when said rotating machinery operational health is poor.

63. **(Original)** A method according to claim 34, further comprising detecting chatter from said rotating machinery using said processor.

64. **(Original)** A method according to claim 63, further comprising determining a frequency and amplitude of said machinery chatter using said processor.

65. **(Original)** A method according to claim 64, wherein said processor assessment comprises a lubricity degradation assessment for said rotating machinery based on said machinery chatter data.

66. **(Original)** A method according to claim 34, wherein said rotating machinery comprises a gearbox comprising a gear having multiple teeth, and said proximeters are spaced at odd harmonics of the resonance frequency quarter wavelength of said teeth.

67. **(Currently Amended)** A system for monitoring rotating machinery having a shaft and circumferentially disposed extensions rotatable with said shaft and spaced apart from one another, the system comprising:

a plurality of proximeters positioned proximate to said rotating machinery and each proximeter being operable to measure and transmit resonant vibration frequency and <u>bending</u> amplitude data derived from a transit time between said individual rotating extensions, along with <u>distance data derived from</u> signal amplitude data, wherein said proximeters are selected from the group consisting of electromagnetic proximeters, <u>and</u> capacitive proximeters, ~~optical proximeters, and fiber optic proximeters~~; and

a processor electrically coupled to receive said data and configured to correlate said data
and thereby produce an assessment of operational health for said machinery.